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CLUSTER ANALYZES OF HOUSEHOLDS' SAVING HABITS

Annamária HORVÁTHNÉ KÖKÉNY[1], Zsuzsanna SZÉLES[2], Marianna HORVÁTH[3]

[1]Collage of Szolnok, Department of Economy, Finance and Management, H-5000 Szolnok Tiszaligeti sétány 14.
[2]Szent István University, Faculty of Economics and Social Sciences, Institute of Accounting and Finance, H-2100 Gödöllő, PáterKároly utca 1.
[3]Collage of Szolnok, Department of Trade and Marketing, H-5000 Szolnok, Tiszaligeti sétány 14.

ABSTRACT

The issue of self-care is becoming more and more important since the last years because of the economic environment. Our research used a household questionnaire to measure self-care behavior , and the degree to which households may to be influenced by the state through a variety of incentives. The questionnaire was completed in 578 households. Cluster analysis was performed based on 16 variables in order to test the different segments we divided households into. We decided to create four clusters. Their properties were the following names: 1 Self-caring with financial knowledge; 2 Self-caring without financial knowledge; 3 Carpe Diem; 4 Hope-based self-care.
Keywords: cluster, households, savings, state influence, financialculture

INTRODUCTION

"The state required as an important forum for the rules of the game, and as a judge, who will explain the rules and to require compliance therewith" (*Friedman*, 1996). The taxsystem is relatively stable, but constantly changing. The taxes, and their effect, and changes in other factors required to implement various tax policies. The goal of the tax is to fund the policy functions of government. The return on savings taxation or sensitive of tax exemption is a political tool. The important fiscal policy tool is the use of taxcredits and tax exemptions, but the effects of taxation are complex and difficult to measure. An immediate effect of taxation is income deprivation. The tax-system effects on the behavior of economy. In many cases,the individual taxpayers make a decision by tax consequences. The long-term savings and other investment opportunities in the taxation system is built on such effects (*Vigvári*, 2008). The appropriate financial knowledge, financial responsibility and foresight in the household saving decisions than seek to minimize their taxes are paid. Many individuals, households have problems with the lack of financial literacy, even though you want to take care of herself and her family. Many people over estimate their knowledge of financial, its cause cannot produce proper financial decisions. People having financial literacy save and achieve greater return on their investments more (*Bodie et al.*, 2011).

AIMS

The tax imposed direct, gratuitous, repetitive and recurring payment, which is paid by members of the business market to the state. The extent and manner of payment of tax are determined by state. Taxes have regulatory functions.These features in the enforcement of the direction and strength of the effect depend on the combined effect of several factors (*Vigvári*, 2008), these long-term saving functions are examined during the research.

MATERIALS AND METHODS

In our research, the population of long-term self-care habits, the influential role of the state and their impact is analyzed. Currently, primary research was performed with the survey, in which there are questions about household saving habits and asset structure. In order to be a targeted suvey, the questionnaire was made through an on-line interface and filled out personally by each subject. The questionnaire has been filled out by 578 households that we devote to research. In the future, an additional 4,000 households are expected to be asked in Hungary by a representative sampling. We analyzed the data using the Microsoft Excel spreadsheet program and SPSS 14.0 for Windows software package. During the study we examined the responses in order to know more about households' saving habits which can be divided into groups, segments.

RESULTS AND CONCLUSIONS

We performed cluster analysis ensuring segments based on 16 variables. The created segments are really different in saving habits and the members of each cluster are similar. We can typify the saving habits.

According to Kendall's indicator only 28.1% agrees of the examined households regarding the factors that influence saving decisions. We have decided to create four clusters (*Jánosa*, 2011).

In the cluster analysis we decided to make segments by 16 questions which can define the saving habits of households (*Table 1*).

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

The number of elements is different in each cluster (*Table 2*). These values are shown in the third table. The first cluster consisted of 171 households , the second cluster 151, the third cluster 46, and the fourth cluster 199 households.

The tables of ANOVA (*Table 1, Table 3*) examine the significance of the variables. Beside the F- value, the Wilks' lambda statistics is also used in the comparison in the fourth table (*Sajtos and Mitev*, 2007).

It can be based on the F and Wilks' lambda values that examined households are most familiar with voluntary health insurance funds and pension fund products. In addition, they have knowledge of the retirement savings account and long-term

investment account, and the advantages of the Home Savings and Loan Association's contract. They are aware that the house and retirement savings are important, and they need „emergency reserves" for the financial security of their family (*Székelyi and Barna*, 2002).

Each household segment can be characterized as follows (*Table 4*).

Table 1

ANOVA data table

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
My family's financial safety is important.	8.761	3	0.177	563	49.413	0.000
It's risky to live without savings	36.039	3	0.642	563	56.179	0.000
It's risky to live without insurance	17.739	3	10.283	563	13.824	0.000
I have to save money every month	39.090	3	10.124	563	34.763	0.000
I need "emergency savings" for the safety of my family	27.196	3	0.482	563	56.383	0.000
I need to save money for the future of my children	32.089	3	0.577	563	55.597	0.000
I need to save money for buying a flat	45.617	3	0.629	563	72.512	0.000
I need to save money for the safety of my retirement	45.984	3	0.797	563	57.678	0.000
I know the retirement saving accounts	178.764	3	10.087	563	164.491	0.000
I know the Start account	191.603	3	10.166	563	164.291	0.000
I know the long-term investment account	203.597	3	10.153	563	176.532	0.000
I know the voluntary fund account.	221.339	3	0.891	563	**248.373**	0.000
I know the voluntary pension fund accounts	230.608	3	0.753	563	**306.437**	0.000
I know the advantages of LTP	190.070	3	10.185	563	160.360	0.000
A financial culture needs to be developed.	28.187	3	0.610	563	46.245	0.000
How much does government tax benefit influence your saving decisions?	5.991	3	10.762	563	3.401	0.018

Table 2

Number of Cases in each Cluster

Cluster	1	171.000
	2	151.000
	3	46.000
	4	199.000
Valid		567.000
Missing		11.000

Table 3

ANOVA 2 data table: Tests of Equality of Group Means, Classification of the major indicators of the cluster

	Wilks' Lambda	**F**	**df1**	**df2**	**Sig.**
My family's financial safety is important.	0.792	49.413	3	563	0.000
It's risky to live without savings	0.770	56.179	3	563	0.000
It's risky to live without insurance	0.931	13.824	3	563	0.000
I have to save money every month	0.844	34.763	3	563	0.000
I need "emergency savings" for the safety of my family	0.769	56.383	3	563	0.000
I need to save money for the future of my children	0.771	55.597	3	563	0.000
I need to save money for buying a flat	0.721	72.512	3	563	0.000
I need to save money for the safety of my retirement	0.765	57.678	3	563	0.000
I know the retirement saving accounts	0.533	164.491	3	563	0.000
I know the Start account	0.533	164.291	3	563	0.000
I know the long-term investment account	0.515	176.532	3	563	0.000
I know the voluntary fund account	**0.430**	**248.373**	3	563	0.000
I know the voluntary pension fund accounts	**0.380**	**306.437**	3	563	0.000
I know the advantages of LTP	0.539	160.360	3	563	0.000
A financial culture needs to be developed	0.802	46.245	3	563	0.000
How much does government tax benefit influence your saving decisions?	0.982	3.401	3	563	0.018

Table 4

Cluster analysis summary table

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**
My family's financial safety is important.	4.94	4.96	4.15	4.92
It's risky to live without savings	4.68	4.43	3.02	4.13
It's risky to live without insurance	3.58	3.04	2.59	3.00
I have to save money every month	4.28	3.93	2.50	3.78
I need "emergency savings" for the safety of my family	4.70	4.64	3.26	4.41
I need to save money for the future of my children	4.66	4.47	3.09	4.20
I need to save money for buying a flat	4.59	4.36	2.76	3.95
I need to save money for the safety of my retirement	4.50	4.19	2.61	3.88
I know the retirement saving accounts	4.47	2.06	2.13	3.47
I know the Start account	3.95	1.55	1.74	1.97
I know the long-term investment account	4.36	1.75	2.04	2.64
I know the voluntary fund account	4.52	1.88	2.65	4.04
I know the voluntary pension fund accounts	4.63	1.94	2.80	4.17
I know the advantages of LTP	4.72	2.29	2.09	3.64
A financial culture needs to be developed	4.76	4.39	3.24	4.36
How much does government tax benefit influence your saving decisions?	3.53	3.09	3.20	3.19
What level do you think the state pension will cover your needs, when you will retire?	1.89	1.99	2.17	1.97

Cluster 1: Conscious self-caring with financial knowledge
Financial security is important for the families in this segment. They save for this security. They know that it is important to save for housing purposes, their retirement, their children's future and a safety „emergency reserve". They know each investment product and the government can influence their saving decisions with the variety of tax breaks and with the options of government grants.

Cluster 2: Self-caring without financial knowledge
For the members of this segment, financial security is important to their families and these members try to contribute to it. They know that it is important to save for housing purposes, their retirement, their children's future and a safety „emergency reserve", although consider these less important than the first cluster members. In the 1st cluster the members have financial knowledge, but in this segment they were not aware of certain investment products, so very difficult financial decisions are taken with due efficiency. Their saving decisions are the least affected by the government.

Cluster 3: Carpe Diem
The 'Carpe diem' segment thinks that the importance of financial security for the family is important, but they do not know the specific investment opportunities and they do not want to pre-save for any purpose, neither residential purposes nor senior years, or even for children in the future. In their opinion an "emergency reserve" is not important at all. This group is typically made up of those who live from paycheck to paycheck and their habits are not in close connection with the amount of their paycheck. Fortunately, this segment contains the lowest numberrespondants. Only 8 percent of the examined households falls into this cluster.

Cluster 4: Hope-based self-care
The members of this segment think that it is important to keep savings for different purposes less than the first and secondclusters. But they do not know the details of investment opportunities.Voluntary health insurance fund and retirement accounts are well known, but the long-term investment account is not. They have medium knowledge of retirement savings accounts and the Home Savings and Loan Association's contract, but they barely know any other investment opportunities. The developing of financial culture is significant for them, as for the segments of the first and second clusters. They are located between the first and second clusters.They try to learn about investment opportunities aligned with their goals. The government tax benefits are also less significant than for the second and the third cluster members. This is probably due to the lack of financial literacy and financial awareness.

A characteristic each of the four clusters considered important was the financial security of their families. Insurance is not considered essential by all. The savings conscious members of the first, second and fourth clusters think that insurance is moderately important. The examined households believe that the state pension will

not cover the needs of that time and tax breaks only have moderate little or no ability to influence the groups.

According to the *Table 5* 95.1% of households could correctly classify to invidiual segments, which means that the subdivision, the cluster analysis was successful.

Table 5

Cluster control board

		Cluster Number of Case	Predicted Group Membership				Total
			1	2	3	4	
Original	Count	1	**164**	0	0	7	171
		2	0	**146**	1	4	151
		3	0	2	**41**	3	46
		4	4	4	3	**188**	199
	%	1	**95.9**	0.0	0.0	4.1	100.0
		2	0.0	**96.7**	0.7	2.6	100.0
		3	0.0	4.3	**89.1**	6.5	100.0
		4	2.0	2.0	1.5	**94.5**	100.0

a: 95.1% of original grouped cases correctly classified.

We also performed the classification of functions (*Table 6*). The first function explains the 77.2% of the variance, the second function 17.4%. The third function explained only 5.4%, so it is not worth it to deal with it.

On the *Table 7* the first function is very similar to the second factor elements, while the second function is very similar to the first factor elements.

On the first diagram (*Figure 1*) we can see the segments of the households, so we plotted the four clusters against the first and second functions, factors.

The chart clearly shows that the third cluster(„Carpe Diem") is separated from the other 3 groups and it is also very perceptible that the fourth cluster is between the first and second clusters. All the clusters can be separated, obviously.

Table 6

Canonical correlation

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.264(a)	77.2	77.2	0.900
2	0.959(a)	17.4	94.6	0.700
3	0.298(a)	5.4	100.0	0.479

a: First 3 canonical discriminant functions were used in the analysis.

Table 7

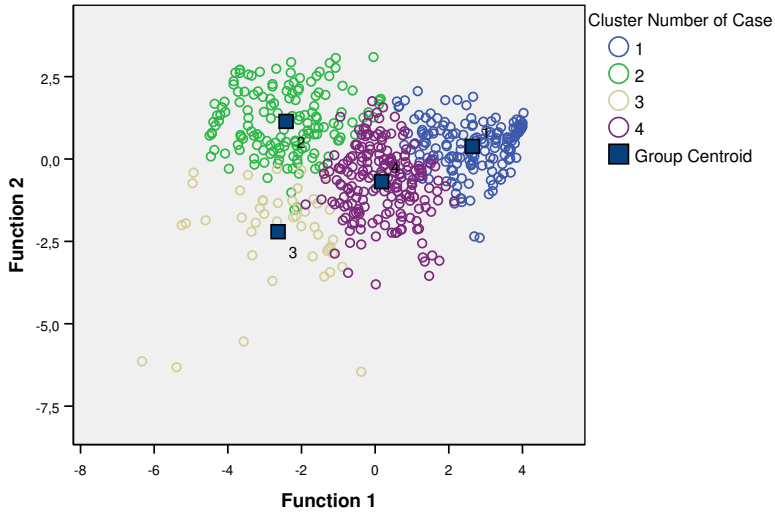
Function value matrix

	1	2	3
My family's financial safety is important	**0.571(*)**	-0.460	0.373
It's risky to live without savings	**0.518(*)**	-0.391	0.336
It's risky to live without insurance	**0.455(*)**	0.037	-0.436
I have to save money every month	**0.452(*)**	-0.073	0.068
I need "emergency savings" for the safety of my family	**0.447(*)**	-0.006	0.099
I need to save money for the future of my children	0.148	**0.547(*)**	0.139
I need to save money for buying a flat	0.112	**0.468(*)**	0.351
I need to save money for the safety of my retirement	0.141	**0.465(*)**	0.152
I know the retirement saving accounts	0.134	**0.464(*)**	0.210
I know the Start account	0.150	**0.460(*)**	0.171
I know the long-term investment account	0.163	**0.346(*)**	0.249
I know the voluntary fund account	0.128	**0.330(*)**	0.195
I know the voluntary pension fund accounts	0.110	**0.143(*)**	-0.090
I know the advantages of LTP	0.414	0.139	**-0.648(*)**
A financial culture needs to be developed	0.087	0.380	**0.557(*)**
How much does government tax benefit influence your saving decisions?	0.059	0.006	**-0.102(*)**

*Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions; Variables ordered by the absolute size of correlation within the function.; *Largest absolute correlation between each variable and any discriminant function*

Figure 1

The clusters of the households



After processing the results of the questionnaire survey it can be determined that most of the households think savings are important. Only 8% of them think that savings are not worth it. This segment lives for today and does not assume any responsibility for their future financial security. In the opinion of the rest of the examined households the development of financial culture is important, but only the first cluster possesses the tools for financial decisionmaking thanks to their special knowledge.

CONCLUSIONS

The self-care habits of our households are important not only in the short term, but also in the longterm. In fact, the next generation of financial positions is affected. The role of the public roles is important to effect on capable of households with long-termsaving, self-reliance encouraged through the tax system, tax exemptions, tax credits or government subsidies and through the education system, in order to become part of general education. Our survey presented these effects as well.

REFERENCES

Bodie, Z., Merton, R.C., Cleeton, D.L. (2011): Economics of finance. (In Hung.) Budapest : Osiris Kiadó, 627 p.

Friedman, M. (1996): Capitalizm and freedom. (In Hung.) Budapest : Akadémiai Kiadó, Florida-Budapest : MET Publishing Corp., 221 p.

Jánosa A. (2011): Data analysis using SPSS. (In Hung.) Budapest : Computerbooks Kiadó

Sajtos L., Mitev A. (2007): SPSS data analysis and research guide. (In Hung.) Budapest : Alinea Kiadó, 43-243. p.

Székelyi M., Barna I. (2002): SPSS Survival Kit - Multivariate analysis techniques for social researchers. (In Hung.) Budapest : Typotex elektronikus Kiadó

Vigvári A. (2008): Finance(system). (In Hung.) Budapest : Akadémiai Kiadó

Corresponding author:

Annamária HORVÁTHNÉ KÖKÉNY
Collage of Szolnok, Department of Economy, Finance and Management
H-5000 Szolnok, Tiszaligeti sétány 14.
Tel.: 36-20-410 -9775, 36-56-510-300/5721
e-mail: kokenya@szolf.hu

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Kaposvár University, Faculty of Economic Science, Kaposvár

WOMEN FARMERS' PERSPECTIVES ON THE USE OF MACHINERY IN AGRICULTURAL PRODUCTION IN TURKEY

Songül AKIN[1], Songül GÜRSOY[2], Abdurahman KARA[1]
[1]Dicle University, Faculty of Agriculture, Department of Agriculture Machinery, Tr-21280 Diyarbakir
[2]Dicle University, Faculty of Agriculture, Department of Agriculture Economy, Tr-21280 Diyarbakir

ABSTRACT

Using of machinery in agriculture, namely agricultural mechanization, embraces the use of tools, implements and machines for agricultural land development, crop production, harvesting, preparation for storage, storage, and on-farm processing. The main criteria such as technical, economic, ergonomic, environmental, and cultural aspects of agriculture have significantly influenced the use of machinery in agriculture. Women workers have been contributing to many fields of agricultural production. Therefore, this study analyzed the views of women farmers about the use of machinery in agricultural production. To this purpose, a survey was administered to leading women farmers to evaluate their perspectives regarding the use of machinery in agricultural production. The results of survey showed that the use of machinery in agricultural production was common and that in Turkey the machineries in widespread use in agricultural production were tractors, ploughs, cultivators, and planters. More than 50 % of leading women farmers stated that the use of machinery in agricultural production resulted in comfort and saved time.
Keywords: women farmer, agricultural machinery, agricultural production

INTRODUCTION

Agriculture is one of the leading sectors in the Turkish economy. Also, Turkey is one of the countries with the most agricultural land in the world. Arable land and forests consist of about 35.5% and 15% of the country, respectively. The cultivated land is around 26.5 million hectares. Around 18.4% of the cultivated land is irrigated. Grain production has an important role in agriculture of Turkey. 76.4% of the cultivated agricultural land, excluding long-life plants, is reserved for grains and other cultivated vegetable products. Wheat is cultivated on 67% of the land on which grain is cultivated. Although there is higher domestic consumption potential in oily seeds, the production is inadequate; the most cultivated plant in oily seeds is the sun flower. Turkey has an important position relating to a great number of fruits and vegetables; Turkey is the world's biggest producer of hazelnuts, figs, apricots and raisins, the 4th biggest producer of fresh vegetables and grapes, the 6th biggest producer of tobacco, the 8th biggest producer of wheat, and the 10th biggest producer of cotton (*Yesilada*, 2010).

Labor, land and water are the most important resources for agriculture. Agricultural production and food security are adversely affected because of insufficient use of farm power, low labor productivity and/or labor scarcity. The

processes involved in agricultural production such as seed bed preparation, planting, weed management, and harvesting require agricultural tools and machinery. Similarly, machines are required to assist with post-harvest loss reduction and on-farm processing because post-harvest processing tasks are often time-consuming, labor intensive and repetitive. The use of machinery in agricultural production and agricultural mechanization, embraces the use of tools, implements, and machines for a wide range of farm operations from land preparation to planting, harvesting, on-farm processing, storage, and the marketing of products. The use of machinery in agricultural production significantly increases the output derived from the human energy expended in crop production and processing. Also, it increases productivity per unit area due to the improved timeliness of farm operations (*Viegas*, 2003; *Takeshima and Salau*, 2010**)**.

Women workers participate in almost every agricultural activity and play important roles in agricultural production in Turkey, as well as all over the world. They may be mothers, housekeepers, wage laborers, agricultural processors, market women and entrepreneurs as well as agricultural producers. Many women work as unpaid family laborers; many are primarily involved in the production of the family food supply, many work intensively in the fields only during the peak labor season (*Ozcatalbas and Akcaoz*, 2010). Therefore, knowing the views of women farmers is very important for productivity and socio-economic development in agricultural production.

In this study, we conducted a survey in Turkey to determine the perspectives of leading women farmers about the use of machinery in agricultural production, the crops produced and agricultural systems conducted by them, as well as priority needs and the machineries mostly used in agricultural areas.

MATERIAL AND METHODS

The main material of this study was a survey applied to 40 leading women farmers who participated in World Farmer Woman Day arranged by Diyarbakır Provincial Food, Agriculture and Livestock Directorate on the 25th of October 2012. A questionnaire was designed and used as instrument for primary data collection. The data obtained from the results of survey were analyzed by using SPSS statistical analysis software (SPSS Institute Inc. 2012).

RESULTS AND DISCUSSION

The types of crops grown by leading women farmers in the survey are shown in *Table 1*. Mostly the leading women farmers were observed to grow wheat. Also, it was determined that 70% of leading women farmers conducted vegetable and fruit production. While 37.5% of the leading women farmers grew all three, wheat, vegetables and fruits, 20% of them grew only vegetable and fruit.

Wheat production is mechanized and does not need intensive labor in Turkey. However, the labor requirement of vegetables and fruits is high. Similarly, *Ngeleza et al.* (2011) stated that the benefits of mechanizing land preparation depend on both

the system and the type of crop cultivated. For instance, the mechanization of land preparation in the vegetable belt was more labor saving and cost effective than mechanization of land preparation in the cereals belt. Traditionally, the roles of men and women in agricultural production are different in Turkey. While men have been most active in the production process of field crops such as land preparation, irrigation, planting, harvesting, women have been mainly concerned with food and horticultural crops, small livestock and agro processing. Technology is gender neutral. The use of technology and the division of labor is a private decision and usually culturally determined. In many cultures, women participate in the mechanization sector and operate the most sophisticated machines. Mechanization may be a means of freeing women and children from agricultural work to more rewarding occupations and receive education (*Rijk*, 2013).

Table 1

The main crops grown by leading women farmers in survey

Crops	Frequency	Percentage (%)
Wheat, lentil	3	7.5
Wheat, lentil, potato	2	2.5
Wheat, corn	3	7.5
Wheat, vegetable, fruit	15	37.5
Wheat, barley, clover	2	2.5
Wheat, grape, fruit	3	7.5
Fruit	2	5.0
Vegetable, fruit	8	20.0
Cotton	2	5.0
Total	**40**	**100.0**

65% of leading women farmers in the survey stated that they have livestock production (*Table 2*). Livestock production is an important and integral component of farming systems in Turkey as well as in West Asia and North Africa (WANA). Livestock also contributes to a large proportion of the income of farmers with small-landholdings, which are by far the most common type of farms. The tasks women perform are commonly often non-mechanized and labour-intensive. Women feed and water animals, clean stables, milk, collect dung for fertilizer and fuel, care for the sick, and milk and process the animal products. The structure of agricultural production differs very much from one region to another in Turkey. For example, while the eastern part of Turkey is still using the traditional methods of agricultural production, the western part makes use of the newest technological developments (*Kaya et al.*, 2013).

When asked their view of the use of milking machines, more than half of leading woman farmers stated that use of milking machines increased the amount and hygiene of milk (*Table 3*).

Table 2

Leading women farmer's response: Do you have livestock?

Response	Frequency	Percentage (%)
Yes	26	65
No	14	35
Total	**40**	**100.0**

Table 3

Leading women farmers' views about milking machines

Crops	Frequency	Percentage (%)
Improving farmer's life quality	18	43.6
Increasing the amount and hygiene of milk	22	56.4
Total	**40**	**100.0**

The use of tractors in agricultural production is the most important equipment in technological development because many tools and machineries in agricultural production are operated by tractor. Tractors bring certain advantages, such as increased labor productivity, contract work and rental opportunities for owners, and reduced drudgery (*FAO*, 1998). 50% of the leading woman farmers who participated in the survey stated that they have tractors (*Table 4*).

Table 4

Leading women farmers' response: Do you have tractor?

Response	Frequency	Percentage (%)
Yes	20	50
No	20	50
Total	**40**	**100.0**

The fact that women farmers use tractors and farm machinery is an important parameter to know in order to improve the mechanization since woman workers using more productive tools and machinery produce more crops. All leading woman farmers who had tractors stated that they could use the tractor (*Table 5*).

Weeds are plants which compete with crops for water, nutrients, and sunlight. They are hardy, with deep root systems, and produce many seeds which, in some cases, remain dormant and viable for decades. There are different weed management methods, including the use of chemicals and machines, and removal by hand. In general, hand weeding is often the job of women in agricultural production. In this survey, the 67% of leading woman farmers stated that weeds during agricultural production were controlled by machines (*Table 6*).

Table 5

Leading women farmers' response: Do you know how to use a tractor?

Response	Frequency	Percentage (%)
Yes	20	50
No	20	50
Total	**40**	**100.0**

Table 6

Weed management and cultivation types used by farmers

Weed management	Frequency	Percentage (%)
Manual	14	35
Machinery	26	65
Total	**40**	**100.0**

When the leading women farmers who participated in the survey were asked "where do you obtain technological information?", they mostly answered "extension agents" and "television" (*Table 7*). *Ozcatalbas and Akcaoz* (2010) stated that extension is different for women and men. Women need direct extension on the crops and livestock they grow or have responsibility for the specific activities that they carry out or want to learn and the skilled tasks they perform. Therefore, the training and dissemination of information to women farmers are critical inputs for the modernizing of farm production.

Table 7

Sources of technological information obtained by leading woman farmers (%)

Source	High	Moderate	Low	No-access
Television	32.5	7.5	7.5	52.5
Extension agents	35.0	22.5	10.0	32.5
Internet	12.5	10.0	7.5	70.0
Acquaintances	10.0	2.5	2.5	85.0

The results of the survey showed that 77.5% of leading women farmers could not use agricultural machinery (*Table 8*). The fact that leading women farmers have the information about using agricultural machinery is important for the modernizing of farm production.

The use of machinery in agricultural production is a key input in any farming system because it increases productivity per unit area due to improved timeliness of farm operations. Also, it contributes to a reduction of drudgery in farming activities, thereby making farm work more attractive and increasing the social-economical level

of the farmer. Therefore, the appropriate choice and subsequent proper use of mechanized inputs into agriculture have a significant effect on agricultural productivity and the profitability of farming. The views of leading women farmers regarding the effect of the use of machinery in agricultural production on social life are seen in *Table 9*. By analyzing the data obtained in the survey, it was determined that about 75% of leading woman farmers stated that the use of machinery in agricultural production save time and increased the farmer's comfort.

Table 8

Leading women farmer's response: Do you have the information about using of agricultural machinery?

Response	Frequency	Percentage (%)
Yes	9	22.5
No	31	77.5
Total	**40**	**100.0**

Table 9

The effect of the use of machinery in agricultural production on social life

Effect	Frequency	Percentage (%)
Save labor	7	17.5
Comfort	14	35.0
Save time	16	40.0
Reducing input costs	3	7.5
Total	**40**	**100.0**

The machinery types that leading women farmers had are shown in *Table 10*. The results of the survey showed that the most common machinery on farms are land preparation machinery such as ploughs and cultivators.

Table 10

The machinery used by leading women farmers in survey

Machinery	Frequency	Percentage (%)
Tractor	5	11.9
Plough	5	11.9
Plough, cultivator	7	16.7
Plough, cultivator, planter	6	14.3
Combine	6	14.3
Pulverizer	2	4.8
Planter, anchor	4	9.5
Total	**40**	**100.0**

CONCLUSIONS

In this paper, leading women farmers' perspectives on the use of machinery in agricultural production in Turkey were evaluated by using the results of a survey study. The main findings are:

1. The types of crops grown by leading women farmers in the survey were wheat, vegetable, and fruit, and 65% of leading women farmers in the survey stated that they have livestock production
2. The tasks women perform were commonly often non-mechanized and labour-intensive.
3. More than half of leading woman farmers stated that using a milking machine increased the amount and hygiene of milk.
4. All leading woman farmers who had tractors stated that they could use the tractor.
5. 77.5% of leading women farmers stated that they could not use agricultural machinery.
6. The leading women farmers who participated in the survey stated that they obtained technological information from extension agents and television. This shows that extension agents and television are important for training and dissemination of information to women farmers.
7. About 75% of leading woman farmers stated that the use of machinery in agricultural production saved time and increased the farmer's comfort.
8. The results of the study show that extension agents and television are important for the training and dissemination of information to women farmers. The training of woman farmers and the dissemination of information about the use of agricultural machinery to women farmers contributed to the modernizing of farm production.

REFERENCES

FAO (1998): Motorized Soil Tillage in West Africa. [online] <URL: http://www.fao.org/waicent/faoinfo/agricult/ags/agse/tilpap.htm>

Kaya, Ç.Y., Akman, N., Erdoğdu, G. (2013): The cattle sector in Turkey, Global picture and focus on situation and perspectives for small cattle farms. [online] <URL: http://www.eaap.org/docs/newsletters/2007-07/Cattlenetwork Proc/ Kaya.pdf>

Ngeleza, G. K., Owusua, R., Jimah, K., Kolavalli, S. (2011): Cropping practices and labor requirements in field operations for major crops in Ghana what needs to be mechanized? IFPRI Discussion Paper 01074

Ozcatalbas, O., Akcaoz, H. (2010): Rural women and agricultural extension in Turkey. Journal of Food, Agriculture and Environment. 8. 1. 261-267. p.

Rijk, A. G. (2013): Agricultural mechanization strategy. [online] <URL: http://www.unapcaem.org/publication/CIGR_APCAEM_Website.pdf>

Takeshima, H., Salau, S. (2010): Agricultural Mechanization and the Smallholder Farmers in Nigeria. Nigeria Strategy Support Program. Policy Note No. 22

Viegas, E. (2003): Agricultural mechanisation: managing technology change. Agriculture: New Directions for a New Nation Edited by Helder da Costa, Colin Piggin, Cesar J da Cruz and James J Fox ACIAR Proceedings No. 113.

Yesilada, A., Ucer, M., Aksoy, I. (2010): Turkish agriculture sector. Egeli & Co. Istanbul. [online] <URL: http://www.epyas.com/uploads/TurkishAgricultureReport.pdf>

Corresponding author:

Songül AKIN
Dicle University, Faculty of Agriculture
Department of Agriculture Machinery
21280 Diyarbakir, Turkey
e-mail: sakin@dicle.edu.tr

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Kaposvár University, Faculty of Economic Science, Kaposvár

PROFILES OF LEADING FEMALE FARMERS IN TURKEY

Songül AKIN[1], Abdurahman KARA[1], Fatma ÖCAL KARA[2], Çağdaş KURT[3]
[1] Department of Agriculture Economy, Faculty of Agriculture, Dicle University Tr-21280 Diyarbakir
[2] Department of AgricultureEcomomy, Faculty of Agriculture, Harran University, Tr-21280 Diyarbakir
[3] Department of Horticultural, Faculty of Agriculture, Dicle University, Tr-21280 Diyarbakir

ABSTRACT

Women have less access to resources than men, especially in rural areas. The participation of women in decision-making processes remains very limited at the community and national level, and even at the family level. Lack of education and social equality generally work against women in developing countries. The social and personal skills of those women living in rural areas and dealing with agricultural production cannot be developed. Women, who make up half of society, play a key role in agriculture and this began to be recognized in the 1980s. Increased training of women in agricultural publication services has been effective in increasing women's skills, as well as contributing to the spread of innovation. Leading women farmers have become part of the agenda with the application of "the farmer leadership project, but the pace of development has been slow compared to that of male leader-farmers regarding the adoption of agricultural innovations in Turkey. In this study, the general profiles of model women farmers in Turkey are determined and focused on how to increase the number of women farmers and their qualifications
Keywords: Rural, Leader, Female Farmers, Profile

INTRODUCTION

Leadership, in general is defined as an ability to influence others, such as the ability to show how to accomplish a goal or mission (*Aslanalp*, 2002). Leadership is mostly a personality characteristic and is not formal, meaning that leadership is defined as a function of the conditions (*Tosun*, 1978). A set of features is not available that all leaders must have. Such a requirement is not necessary, because there is a need of differentiation of leader qualifications according to the conditions in the current sector (*Özçatalbaş*, 1998).

There are four types of leadership based on the leader's effectiveness. In developing societies where democratic structures remain undeveloped (a latent feudal social structure), the leader is the person who decides what work is necessary (and who should perform it). Leaders who have proven expertise and have knowledge in adequacy of specific topics are defined as expert leaders. Opinion leaders are those who can affect other people's thoughts and behaviors. A leader through action or application is a talented person whose entrepreneurial characteristics are developed and has the ability to adapt easily to new ideas. Opinion leaders and action leaders are beneficial to agricultural extension. There are those „leaders" which sociologists mention in every society, which are called local leaders in agricultural extension (*Gift*, 2012). These people are accepted as the

authority in specific topics due to experiences and achievements in the past. Local leaders are more concerned with the outside world than other individuals living in the community. Local leaders are more willing to adopt new agricultural technologies than other farmers. For this reason, cooperation between local leaders, entrepreneurs and leading publishers can be widely influential in facilitating the acceptance of the use of technology with local farmers, because working together they have direct access to rural communities.

Although the agricultural sector is an important sector in the economy, its overall contribution to remain limited due to structural problems. Agricultural extension has a very important role in the solution of these problems, and in particular in the development of agricultural technology.

Agricultural publication plays an important role in the diffusion and adoption of innovation, as well as in implementation (*Kumuk*, 1996). As regards agricultural extension, it is quite rational to aim for the fastest production at the lowest cost by using beneficial ideas and action leaders to guide the broad masses of farmers.

Agriculture, environment, global pollution, soil contamination, potable water, limited resources and disadvantaged population groups directly affect both the individual and society (*Ministry of Food, Agriculture and Livestock*, 2004). In Turkey, as in other developing countries, it is of great importance to raise the social status of women and integrate them into the current of development. Due to the low incomes in the agricultural sector, poverty and social exclusion affect women to a greater extent than men. Women are less experienced in managing resources, have fewer employment opportunities and receive less social security benefit, are less involved in public life, especially in rural areas, compared to men (*Gülçubuk*, 2012). The participation of women in decision-making processes at the community and national level is very limited. According to the statistics, the proportion of women in decision-making is higher than that of employed in agriculture in Turkey (*TUIK*, 2011).

It is known that the women's (50.3% of the working population in rural areas in Turkey) leadership qualities are not developed according to the above-mentioned reasons. Women living in rural areas could not take place in the formal area, so the development of informal structuring should be provided as in the Halilbeyli Participatory Rural Appraisal Project (*Özkaya*, 1999). There is a relationship between personal characteristics and leadership that can be developed by trainings. There is a direct correlation between the level of leadership qualifications, being a model to the community and getting in action. Success is extremely dependent on having the confidence of publishers in determining the leading farmers when it comes to adopting innovations in agricultural extension.

MATERIAL AND METHODS

40 women farmers constitute the main body of the study. These women were invited by the Ministry of Food, Agriculture and Livestock to Diyarbakir on October 15, 2013 to participate in World Woman Farmers' Day. All identifying information obtained from our sources remains confidential. It is accessible to all

the elements of the universe so to use complete enumeration method makes sense in case of limited or narrow range of cases where the universe is concerned (*Karasar*, 2000). For this reason, the bulk of the material obtained in the study is derived from questionnaires personally administered to 40 women. The data obtained from the questionnaires was evaluated by SSPS package program by looking at the frequency and percentage values of the questions and also a correlation analysis was done.

RESULTS AND DISCUSSION

37.5% of the leading female farmers surveyed are in the group of young farmers (aged between 20 and 30 years), while the rate of 31-40, 41-50 and 61-70 years age group was 25.0%, 22.5% and 5.0%, respectively. 42.5% of the participants live in villages, while 57.5% of the participants live in towns and cities. When the village centers thought as a settlement that has an intensive agricultural production, the obtained results are provoking. 35.0% of the participants are graduated from primary school, 10.0% are graduated from secondary school, 42.5% are graduated from high school and 12.5% are graduated from university.

It has been identified that 35.0% of the participants came from East-Southeast Anatolia, 25.0% from the Mediterranean, 10.0% from Central Anatolia, 15.0%, from Marmara, 10.0% from the Aegean and 5% from the Black Sea region. By looking at the distribution by region due to the regulation of the meeting, in the province of Diyarbakir Eastern and Southeastern Anatolia regions seem to affect participation positively. Looking at the distribution of leading women farmers from the perspective of educational level and distribution by region, we find that there is no university graduate in the Aegean and the Black Sea region, while there is one from each region of the Mediterranean, Marmara and Central Anatolia and two of the participants from Southeastern Anatolia had university degrees.. In general, the leading women farmers in the Southeast Anatolia region were identified with high levels of education in comparison to the level of education in other regions (*Table 1*).

The literacy rate was 85.60% according to the statistics, whereas East and Southeast Region, with a ratio of 68.79% in Southeastern Anatolia male and female literacy rate was 81% and 55.60%, respectively. This is interpreted in two ways; leadership skills of educated women are developing in rural areas or the leader is chosen from educated women farmers 52.5% of the participants were single and 47.5% were married.

Leader farmers have declared that 45% of the respondents had 1-5 years of experience, while 22.5% of the respondents had 6-10 years, and 12.5% of the respondents had 16-20 years of experience. 27.5% of the respondents' allocated 5-6 hours per day to agricultural production, 17.5% of the respondents' allocated 1-2 hours. 30% of the participants spent 1 hour, 7.5% spent 4 hours, and 5.0% spent 5 hours to process agricultural products. This shows that women leaders allocate more time to agricultural production (*Table 2*).

Table 1

Comparison of level of education of leading women farmers by region (Crosstab)

	Educational background				
District	**Primary school**	**Secondary school**	**High school**	**University**	**Total**
East and South east Anatolia	4	2	6	2	14
Mediterranean	5	1	3	1	10
Central Anatolia	1	1	1	1	4
Marmara	1	0	4	1	6
Aegean	2	0	2	0	4
Black sea region	1	0	1	0	2
Total	**14**	**4**	**17**	**5**	**40**

Table 2

Allocated time of leader in experiencing and agricultural production-product processing in farming

Experience in farm leadership			**Allocated time For agricultural production**			**Allocated time For agricultural product processing**		
Year	Fre.	%	hour	Fre.	%	hour	Fre.	%
1-5	18	45.0	1-2	7	17.5			
6-10	9	22.5	3-4	5	12.5	1	12	30.0
11-15	2	5.0	5-6	11	27.5	2	11	27.5
16-20	5	12.5	7-8	5	12.5	3	12	30.0
21-25	3	7.5	9-10	7	17.5	4	3	7.5
25+	3	7.5	10+	5	12.5	5	2	5.0
Total	**40**	**100**	**Total**	**40**	**100**	**Total**	**40**	**100**

Participation of leading farmers in agricultural training courses is usually higher than others because they are concerned more with the outside world (*Özçatalbaş*, 1998). Participating in agricultural training can be perceived as an important criterion for farming leaders. 65% of the surveyed women participated in agricultural training.

When the reasons for non-participation were questioned, 58% of women claimed that training options were not given, 14% said it was not allowed by the husband 14% ranked very high the effective lack of topics of interest and 7% remarked that non-participation of friends was the reason (*Table 3*).Sources of agricultural information were rated by the participants. Results show that 37.5% of participants ranked agricultural engineers very high as a source of information;

television was ranked very high as a source of agricultural information with a 27.5% rate. Whereas 20% of the respondents listed the Internet as a source of information, a very high percentage, 10% of respondents, ranked wives high effectiveness as the source of agricultural information and 15% has ranked colleagues as a source of agricultural knowledge (*Table 4*).

Table 3

Reasons for non-participation in education

Reasons	Very high		High		Low		Very Low	
	Fre.	%	Fre.	%	Fre.	%	Fre.	%
There is no need	1	7.0	-	-	-		-	-
Training option is not given	8	58.0	1	7.0	-	-	2	14.0
Not allowed by husband	2	14.0	-	-	-	-	-	-
non-participation of friends	1	7.0	1	7.0				
Lack of effective topics	2	14.0	-	-	-	-	-	-

Table 4

Sources of agricultural knowledge

Agricultural knowledge sources	Very high		High		Low		Very low	
	Fre.	%	Fre.	%	Fre.	%	Fre.	%
Wives	4	10.0	-	-	4	10.0	8	20.0
Colleagues	6	15.0	9	22.5	6	15.0	6	15.0
Television	11	27.5	14	35.0	7	17.5	1	2.5
Agricultural engineers	15	37.5	11	27.5	2	5.0	5	12.5
Internet	8	20.0	10	25.	7	17.5	2	5.0

Agricultural education and extension are carried out by the government through the provincial and district directorates' agriculture in Turkey. Frequency and reasons for going to these directorates are considered as an indication of interest in the outside world leadership in farming, which is often sought as a benchmark (*Table 5*).

Farmers' membership in local organizations is a fairly important criterion among the general characteristics (*Albrecht*, 1969). Membership in co-operatives is queried and the participants have a high ratio of 62.5%; cooperative education has been revealed in a ratio of 30%. Participants were asked about the factors that affect the cooperative membership. Results show that 35% of participants have an insecurity

to co-chairman, 25% are not allowed by the husband; the ratio of 17.5% for female membership is connected with the cooperative that is not common in environs; the absence of a well-functioning co-operative has a 10% ratio.

Table 5

Frequency and reasons of visiting agricultural directorates and that of cooperative membership

Visit to agricultural directorates			**The reason of visiting agricultural directorates**			**Membership to cooperative**		
Frequency of visit	**Fre**	**%**	**Reason**	**Fre**	**%**	**Situatio**	**Fre**	**%**
No comment	2	5.0	No comment	17	42.5	Yes	15	37.5
Once in a month	8	20.0	Acknowledgement	3	7.5	No	25	62.5
Once in 2-3 months	5	12.5	Supporting	9	22.5			
Once in a year	13	32.5	Ofiicial procedure	10	25.0			
Never	12	30.0	Visiting friend	1	2.5			
Having cooperative training			**The reason of membership to cooperative**			**The reason of elected leader farmer**		
Situation	**Fre**	**%**	**Reason**	**Fre**	**%**	**Reason**	**Fre**	**%**
Yes	12	30.0	Distrust to officer	14	35.0	Knowledgeable	8	20.0
No	28	70.0	Not having time	3	7.5	Experience	3	7.5
			Disallow of viwes	10	25.0	Sociability	5	12.5
			Constaint of responsibility	2	5.0	İnnovation	4	10.0
			Being a worse example	4	10.0	Family	10	25.0
			Lack of women membership	7	17.5	Participation Leader farmer competition	9	22.5

The „Women Farmers are Competing„ program is an activity that has been organized and supported by the Ministry of Food, Agriculture and Livestock since 2004. The impact of social, economic and the working life on women farmers has been identified in an „Impact Assessment Study of Women Farmers Competing„ organized by the Application and Research Center of Ankara University for Development (AKÇAM) in 2012. When the most effective cause is asked in the leader farmer election, family comes first with a 25% ratio, while the effect of being a female farmer participating in the competition had a ratio of 22.5%. Leading farmers' election has an impact such as changes in social status with a ratio of 22.5%, whereas the third important factor is knowledge (20%) in Leader farmers election. This quality must have existed between the farmers for quality leadership.

CONCLUSIONS

Although women are at the center of agricultural production, they are deprived of social rights such as property acquisition, and therefore cannot have the economic power to make decisions regarding effective production and this seems to maintain

the continuity of the male-dominated social structure. The success of women may be involved with the acquisition of feature in the sector which can only be accomplished with an effective agricultural extension. Although women have an informal relation in rural areas, in Turkey this is usually quite effective. Even in agricultural extension activities for women, men have become dominant in the formal structuring in rural areas. This is a common condition as in participatory rural development activities such as the Halilbeyli example.

Taking into account the existing structure in Turkey, the creation of a women's group to ensure the ability of women's self-expression in agriculture extension activities would affect women's leadership skills positively and may attract women to agricultural extension. Participation in a Women Farmers Contest has created innovation and the possibility of women's election as leaders has an effect on a woman's life, so this must be addressed more than men in agricultural extension.

As it is understood from the results of the research,, there is a parallel between the increase in educational level and leadership. The formal education of women farmers cannot be carried out,, so agricultural extension training should be formed in accordance with the principles of adult education, particularly to increase the participation of women producers and women's education in agricultural areas for increased women farmer development. As it can be seen in the research results, there are relatively few women farmers as leading members in the cooperative. Establishment of cooperatives -which provide an environment where women can express themselves and can ask questions more easily - would support women to be able to contribute to effective ownership and farming leadership.

REFERENCES

Albercht, H. (1969): Innovative processes in agriculture (In Germ.) Verlag der sip-schriften Saarbrücken

Armağan, G., (2012): Agricultural Extension and Communication Lecture. (In Turk.) [online] <URL: akademik.goks.org/wp-content/uploads/>

Aslanalp, Y. (2002): Leadership. (In Turk.) Master thesis. Mugla University

Gıda, Tarım ve Hayvancılık Bakanlığı (2004): II. Agricultural Council, Rural Development Policy, The Commission Report. (In Turk.) Ankara

Gülçubuk, B. (2012): Rural Cooperative Organization and women. Ankara.

Karasar, N. (2000): Research Method. Ankara : Nobel Yayıncılık

Kumuk, T., Taluğ, C. (1996): Turkish Agricultural Extension System Needs Change. Türkiye 2. Tarım Ekonomisi Konşresi, Çukurova Üniversitesi Basımevi, Adana.

Özçatalbaş, O., Gürgen, Y. (1998): Agricultural Extension and Communication. Adana : Baki Kitap ve Yayınevi

Tosun, K. (1978): Business Management. In Turk.) İstanbul : Birinci Cilt

TUİK (2011) Labour Force Statistics. (In Turk.)

Corresponding author:

Songül AKIN
Dicle University, Faculty of Agriculture
Department of Agriculture Machinery
21280 Diyarbakir, Turkey
e-mail: sakin@dicle.edu.tr

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Kaposvár University, Faculty of Economic Science, Kaposvár

AN ECONOMIC COMPARISON OF TWO RABBIT GENOTYPES FOR PRODUCTIVE AND CARCASS TRAITS

Katalin SZENDRŐ[1], Zsolt MATICS[2], István RADNAI[2], Zsolt GERENCSÉR[2]
[1]Kaposvár University, Faculty of Economic Science, H-7400 Kaposvár, Guba Sándor út 40.
[2]Kaposvár University, Faculty of Agricultural and Environmental Sciences, H-7400 Kaposvár, Guba Sándor út 40.

ABSTRACT

The aim of the study was to carry out an economic evaluation of crossbred rabbits originated from Pannon Large (PL) and Hungarian Giant (HG) bucks based on the most important cost factors of feed and the revenue from processed products. Pannon Ka (maternal line) does were inseminated with PL and HG sperm. The crossbred rabbits (n = 336) were weaned at 5 weeks of age, their body weight and feed intake were measured fortnightly. Rabbits were reared until the age of 12 weeks. The weight of whole carcass, head, heart and lung, liver, kidneys, fore part, loin fillet, mid part's bone, thigh meat, and thigh bone were quantified. The revenue from whole carcass and carcass parts were based on the Italian market price. Gross margin was calculated on the level of production chain (including farm and slaughterhouse). Feed intake (147 and 132 g/day), weight gain (42.3 and 39.5 g/day) and body weight at 12 weeks of age (3.17 and 2.94 kg) were lower by 10.2%, 6,6% and 7.43%, respectively in Group MxHG than in MxPL rabbits. A 0.9% difference was observed in dressing out percentage, in favour of MxPL (62.7% and 61.6%). Ratios of fore-, mid-, hind part and perirenal+scapular fat to reference carcass were 27.5%, 33.4%, 36.9% and 2.16% in MxPL rabbits, whereas 27.1%, 33.6% 37.3% and 1.94% in MxHG group. Total cost of production was 3.82 and 4.20, while total revenue from carcass parts were 7.68 and 8.49 €/rabbit for MxHG and MxPL, respectively. Results showed a 11% difference between gross margin values of MxHG and MxPL, meaning that 11% more rabbit product of MxHG should be sold in order to obtain the same revenue as of MxPL. It can be concluded that productive performance and dressing out percentage were significantly lower in HG rabbits than in PL group, also gross margin difference is considerable, and therefore Hungarian Giant rabbits could be used mainly in alternative, organic rabbit production systems in which their lower performances are compensated by a higher price of sold rabbits.
Keywords: rabbit genotypes, production, carcass traits, economic evaluation, gross margin

INTRODUCTION

Besides rabbit meat products from intensive rabbit breeding, there is a growing interest in less intensive breeds kept in alternative housing and feeding conditions. Due to this fact, most hybrid breeding enterprises trade not only with white terminal paternal line rabbits, but also with colored terminal males to produce growing rabbits reared in alternative conditions. Additionally, the reduction of feeding cost is of primary importance to rabbit producers, and the main possibilities include using efficient stock and good quality feed, as well as effective farm management and the limitation of losses (*Maertens*, 2009). On the other hand, slaughterhouses are interested in realizing ever higher profits from the products sold. However, reports on economic evaluation for

growth and carcass traits are rare (*Mikó et al.*, 2010; *Verspecht et al.*, 2011; *Szendrő et al.*, 2012; *Szendrő et al.*, 2013). The aim of the experiment was to economically compare an intensive and an alternative production system (two genotypes, two housing systems and two feeding methods). In this paper the productive and carcass traits of rabbits are compared from the economic point of view, based on the most important cost factors, including feed and the revenue from processed products.

MATERIAL AND METHODS

The experiment was carried out at Kaposvár University. Pannon Ka (maternal line) females were inseminated with the semen of Pannon Large or Hungarian Giant males (MxPL and MxHG, respectively). The crossbred rabbits (n = 336) were weaned at 5 weeks of age, half of them were kept in cages (3 rabbit/ cage), the other half were kept in pens (10 rabbits/ pen). The stocking density was 16 rabbit/ m^2 in each case. Two subcategories were formed (however this study does not consider these factors); rabbits received solely commercial pellet or commercial pellet supplemented with hay, *ad libitum*. Water was available *ad libitum* from nipple drinkers. The temperature in the room was 15-17^{o}C, and it was illuminated by natural light (through windows), however additional artificial lighting was used to achieve 16h of light.

The price of a slaughter rabbit (1.66 €/kg) was based on French data (*Coutelet*, 2011). Weaned rabbit's price (2.0 €/kg) was considered 20% above that of slaughter rabbits. The price of feed (0.216 €/kg) was also obtained from *Coutelet* (2011). Total cost of production was based on feeding cost, which may represent 70% of total production costs (*Maertens*, 2009). Other costs (including slaughtering) were not considered in this study as these are mostly constant, regardless of genotypes. Hence, total expenses include the price of the weaned rabbit and the total cost of rearing until slaughter. The following carcass weights were measured: head, heart and lung, liver, kidneys, perirenal and scapular fat, fore part, loin fillet, mid part's bone, thigh meat and bone, and the whole carcass. Revenue from the whole carcass and different carcass parts were Italian market-specific; data were gained from the owner of a Hungarian rabbit slaughterhouse: whole carcass (4.3 €/kg), loin fillet (12.0 €/kg), thigh meat (11.0 €/kg), liver (2.8 €/kg), kidney (2.5 €/kg), fore part (2.6 €/kg), head, bone, heart, and lung (0.45 €/kg). Gross margin was calculated based on the whole production line costs as the difference between the revenue from rabbit products and production cost (excluding the cost of slaughtering).

Statistical Analysis

Productive and carcass traits were evaluated by means of one factor ANOVA, mortality was analyzed by Chi^2-test, with using the SPSS 10.0 software package.

RESULTS

Productive traits of the two genotypes are summarized in *Table 1*. The weight was higher in MxPL ($P<0.001$) in each age category. The difference increased from 7.5% to 11% between 5 and 9 weeks of age, and decreased to 8% by the age of 12 weeks. Concerning weight gain, significant differences were found only between 5-7

and 7-9 weeks, in favor of MxPL rabbits. Despite this, the total weight gain between 5 and 12 weeks of age was 7% higher for MxPL group than for MxHG rabbits. MxPL rabbits consumed more pellet in each age category than that of MxHG; not significant difference was found only between the age of 11 and 12 weeks. Average difference was 11.4% between the groups, which was the highest between 7-9 weeks of age (25.3%). There was no significant difference in the feed conversion ratio. However, the mortality in MxHG was twofold compared to the MxPL group; significant difference was found only between 5-7 weeks of age.

Table 1

Productive performances of crossbred rabbits originated from Pannon Ka (M) does and Pannon Large (PL) or Hungarian Giant (HG) bucks

Age (wk)	Genotype		P
	MxHG	MxPL	
Weight, g			
5	948	1019	<0.001
7	1654	1781	<0.001
9	2090	2319	<0.001
11	2658	2907	<0.001
12	**2935**	**3170**	**<0.001**
Weight gain, g/day			
5-7	47.1	50.8	<0.001
7-9	31.8	39.0	<0.001
9-11	39.6	41.5	0.088
11-12	39.0	37.6	0.344
5-12	**39.5**	**42.3**	**<0.001**
Feed intake, g/day			
5-7	109	119	<0.001
7-9	110	133	<0.001
9-11	143	161	<0.001
11-12	166	176	0.158
5-12	**132**	**147**	**0.002**
Feed conversion ratio			
5-7	2.23	2.25	0.699
7-9	3.58	3.29	0.230
9-11	3.68	3.93	0.119
11-13	4.07	4.76	0.082
5-12	**3.39**	**3.56**	**0.411**
Mortality, %			
5-7	2.98	0.00	0.024
7-9	1.84	2.98	0.502
9-11	3.75	1.23	0.145
11-13	1.30	0.62	0.537
5-12	**9.52**	**4.76**	**0.091**

Carcass traits are shown in *Table 2*. Due to the higher slaughter weight, the weight of almost all carcass parts was significantly higher in MxPL rabbits. Concerning carcass traits (ratio of warm-, chilled- and the reference carcass refer to slaughter weight) were 1.1-1.5% higher in MxPL rabbits than in the MxHG group. Ratios of fore-, mid-, hind part and perirenal+scapular fat to reference carcass were 27.5%, 33.4%, 36.9% and 2.16% in MxPL rabbits, whereas 27.1%, 33.6% 37.3% and 1.94% in MxHG group.

Table 2

Carcass traits of crossbred rabbits originated from Pannon Ka (M) does and Pannon Large (PL) or Hungarian Giant (HG) bucks

Characteristics	Genotype		P
	MxHG	MxPL	
Body weight (at slaughter), g	2881	3109	<0.001
Warm carcass, g	1777	1951	<0.001
Chilled carcass, g	1736	1906	<0.001
Reference carcass, g	1463	1618	<0.001
Dressing out percentage, % (relative to body weight)			
Warm carcass	61.6	62.7	<0.001
Chilled carcass	60.2	61.3	<0.001
Reference carcass	50.7	52.0	<0.001
Edible offal			
Heart+lung, g	22.6	23.5	0.012
Liver, g	76.1	87.8	<0.001
Kidneys, g	18.4	18.1	0.318
Fat			
Perirenal fat, g	21.9	27.0	<0.001
Scapular fat, g	7.45	10.55	<0.001
Carcass parts			
Head, g	153	156	0.037
Fore part, g	396	444	<0.001
Mid part, g	492	542	<0.001
Rear part, g	545	596	<0.001
Hind legs			
Right leg, g	257	281	<0.001
Left leg, g	261	286	<0.001
Meat			
Right leg fillet, g	182	201	<0.001
Left leg fillet, g	184	204	<0.001
Loin fillet (*Longissimus dorsi*), g	173	190	<0.001
Ratios relative to reference carcass, %			
Fore part	27.1	27.5	0.010
Mid part	33.6	33.4	0.178
Rear part	37.3	36.9	0.001
Fat depot	1.94	2.16	0.018

In terms of prices, weaned rabbits of MxPL were more expensive by 7.5% compared to MxHG (*Table 3*). Due to the higher feed intake of MxPL - and therefore their costs - the price difference of values between MxHG and MxPL increased to 8% by the age of 12 weeks. In general, feed costs represent 70% of the total costs (*Maertens*, 2009). Total cost of production and total expenses (including the price of rabbit at 5 wk) of MxHG appeared to be lower, but their weight was also lower at the end of the experiment.

Table 3

Total expenses and prices depending on the genotypes (€/rabbit)

Genotype	MxHG	MxPL
Price of rabbit at 5 wk (expense)	1.90	2.04
Cost of feed (5-12 wk)	1.35	1.52
Other costs	0.58	0.65
Total cost of production	1.93	2.17
Total expenses	3.83	4.20

Total cost of production = cost of feed (70%) + other costs (30 %); Total expenses = price of rabbit at 5 wk + cost of production.

When total revenue from the whole carcass was calculated, the income from MxPL group was 8.20 €/kg, while for MxHG rabbits was lower by 10% (*Table 4*). On the other hand, selling different portions of the carcass leads to a higher total income, ranging between 7.68 and 8.49 €/kg for MxHG and MxPL, respectively. Loin fillet and thigh meat are the most valuable carcass parts with 12 and 11 €/kg. Since the proportion of the thigh meat is about 21% of the whole carcass, the revenue from this product is of the highest interest for the slaughterhouse. The income from thigh meat was the highest (4.46 €/kg) for MxPL group.

Table 4

Total revenue from whole carcass and carcass parts depending on genotypes (€/kg)

Genotype	MxHG	MxPL
Revenue from whole carcass	**7.46**	**8.20**
Revenue from different carcass parts		
Thigh meat	4.03	4.46
Loin fillet	2.08	2.28
Fore part	1.03	1.15
Liver	0.21	0.25
Kidney	0.05	0.05
Heart + lung	0.01	0.01
Head	0.07	0.07
Mid part's bone	0.14	0.16
Thigh bone	0.07	0.07
Total revenue from carcass parts	**7.68**	**8.49**

When total expenses of and revenue from rabbit products were calculated, the highest difference (gross margin) per rabbit was found for MxPL rabbits (*Table 5*). Results showed a 11% difference between values of MxHG and MxPL groups, meaning that 11% more rabbit product of MxHG should be sold in order to obtain the same revenue as of MxPL.

Table 5

Profitability of production lines as affected by genotype

Genotype	MxHG	MxPL
Rabbit slaughter weight (kg)	2.88	3.11
Revenue from rabbit products (€/r)	7.68	8.49
Total expenses (€/r)	3.83	4.21
Gross margin (€/r)	**3.85**	**4.28**

€/r = €/rabbit

Since the evaluation was carried out on crossbred rabbits, meaning that the differences between the groups show half the difference between the PL and HG breeds, therefore there could be even higher differences between the two genotypes.

CONCLUSIONS

Based on the results it can be concluded that the MxHG is not competitive as a terminalsirebreed in intensive farming. Therefore, Hungarian Giant rabbits may play a role mainly in alternative, organic rabbit production systems in which their lower performace and more expesive rearing are offset by a higher selling price.

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REFERENCES

Coutelet, G. (2011): Performances moyennes des élevages cunicoles en France pour l'année 2010 Résultats de RENACEB et RENALAP (In Fr.) Cuniculture Magazine, 38: 24-27. p.

Holdas, S., Szendrő, Zs. (2002): Farm animals – Breeds – Rabbit (In Hung.). Budapest : Mezőgazda Kiadó, 140. p.

Maertens, L. (2009) Possibilities to reduce the feed conversion ratio in rabbit production. Giornate di Coniglicoltura ASIC. Forli, Italy, 1-10. p.

Hungarian Giant Rabbit-breeders Association: [online] <URL: http://magyaroriasnyul.com/> [29. August, 2013]

Mikó, A., Radnai, I., Gerencsér, Zs., Matics, Zs., Nagy, I., Szendrő, K., Szendrő, Zs. (2010):The profit of the slaughterhouses realized in the course of CT-aided selection of rabbits. Acta Agr. Kapos. 14: 103-108. p.

Szendrő, K., Metzger, Sz., Odermatt, M., Radnai, I., Garai, É, Horn, P., Szendrő, Zs. (2013): Effect of age and weight of rabbits at slaughter on carcass value. Acta Agriculture Slovenica, 100 : 3333-337. p.

Szendrő, K., Odermatt, M., Matics, Zs., Széles, Gy., Horn, P., Szendrő, Zs. (2012): Economic evaluation of rabbit genotypes differing in growth rate and carcass characteristics. In: Proc. World Rabbit Congress, Sharm El- Sheikh, Egypt, 809-813.p.

Verspecht, A., Maertens, L., Tuyttens, F., Van Huylenbroeck, G., Verbeke, W. (2011): Economic impact of decreasing stocking densities in broiler rabbit production based on Belgian farm data. World Rabbit Sci., 19: 123-132. p.

Corresponding author:

Katalin SZENDRŐ
Kaposvár University
H-7400 Kaposvár, Guba Sándor út. 40.
Tel: 36-82-505-800/3205
e-mail: szendro.katalin@ke.hu

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SITE SELECTION, STORE FORMAT, CUSTOMER NUMBER, SALES AND THEIR CONTEXT IN THE RETAIL BUSINESS

Adrienn KURUCZ
Szent István University, Doctoral School of Management and Business Administration
H-2103 Gödöllő, Páter Károly u. 1.

ABSTRACT

After the credit rating agencies downgraded Hungary's credit rating in November 2011 and January 2012 there were many unfavourable effects on the country and its real estate/property market. The efficiency of the commercial property market is furthermore affected by some of the government's provisions, such as the 'plaza stop' or the 'special tax/solidarity tax' imposed on retail chains. As a result of the above listed actions it is highly possible that the developers will completely freeze their commercial investments in the coming years. A current important question is: in which direction will the Hungarian commercial property market and retail market develop?
(Keywords: retail, business, customer number, sales, format)

INTRODUCTION

I had four objectives in this work. Firstly, to prove that there is a high correlation between site selection, store format, customer number and turnover in the retail business. Secondly, to demonstrate empirically that small and large format stores might have different behaviours from the customer number and net sales point of view. Thirdly, to illustrate that retailers can make mistakes in sales forecasting, choosing store location and format, when they only analyse past trends instead of utilizing analyzed and weighted own management information data as well. Finally, the adage „location, location, location" is especially applicable to retail real estate development.

MATERIAL AND METHODS

In the first instance I investigated both the Hungarian and International macro-economic and microeconomic literature relating to commercial property's site selection and customer behaviour when choosing shop, which I analyzed with reference to personal knowledge. Besides emphasizing the theoretical disciplines of the topic, I collected and analyzed market data for the different store formats. In addition to this, I used extensive personal experience and knowledge – ten years in the retail property industry – to strengthen to my research.

Store size: hypermarket, supermarket or discount store?

'The hypermarket in the late nineties was a novelty not only in Hungary but also in Central Europe. However, the world has changed since then, along with trade and consumer habits, expectations. Today the trend shifts towards smaller stores, the

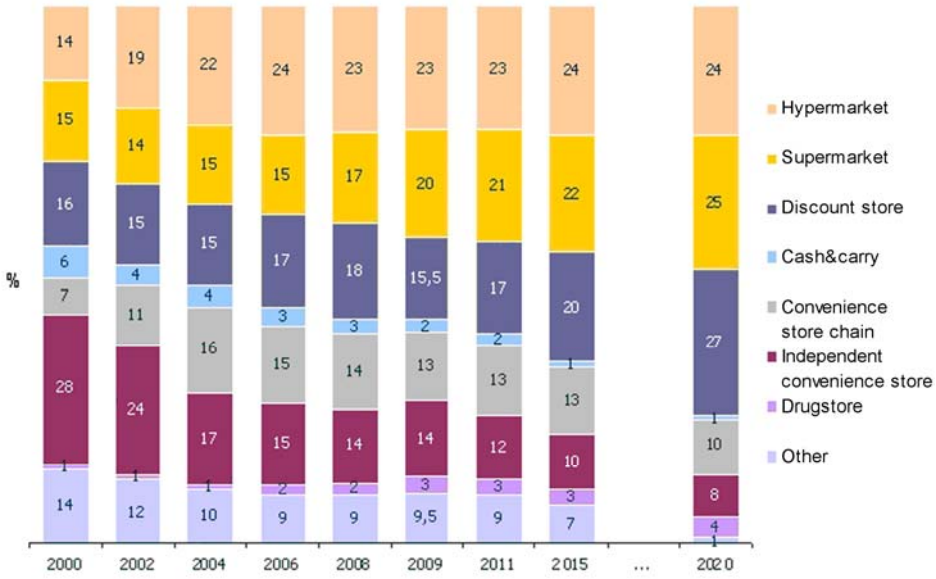
emphasis is on the convenience of shopping together with the online and other shopping options. Thus it is worth re-evaluating the hypermarket format. Global trend show that more and more people prefer to buy locally. Three or four times a month people visit the large stores but if there is a well-equipped store in their area they do their shopping there during the week.' (*Gray*, 2011 1 p.)

The same assertion is confirmed by *G. Tóth* (2011), who said that although retail sales decreased steadily since 2006, a growing tendency is shown that customers buy in stores closer to their home.

'During the crisis, 70% of consumers switched to cheaper food. It is a contradiction that – despite increasing price sensitivity – more and more customers shop in the local supermarkets, instead of buying food for 20% less in the hypermarkets on the outskirts of the city. As a result of the high gasoline prices the consumers buy locally, more frequently and spend less per visit. A few years ago the market was completely transformed by the large expansion of hypermarkets, but since then the number of large shops - producing 30% of the total turnover of daily consumer goods - remained unchanged' (*G. Tóth*, 2011 58 p.)

Figure 1

Store format share on return from daily consumer goods (2000-2020)



Source: *GFK* - V*ilággazdaság Online*, 2010

'No growth is expected next year in the current 23% market share of hypermarkets and in ten years this trade channel will only own 24% of market positions – stated Gfk Hungaria based on their survey of trends in trade September 2010. However supermarkets are predicted to continually increase their market share. Many retail chains in this category have expansionary policies and therefore the market share of

supermarkets may increase to 21% in 2011 while 22% in 2015 and even up to 25% in 2020. According to analysts the independent small shops' share from daily shopping items would moderate from 13% to 10% in the coming decade. This tendency would then force even more of the owners of these smaller stores to become part of a joint sourcing venture.' (*GFK - Világgazdaság Online*, 2010)

I agree with the first diagram's figures concerning supermarkets (*Figure 1*), however I would not state that the remaining prognosis is acceptable according to the current state of the market. In my opinion, the discount stores will not achieve a 27% market share by 2020, as this now seems unreasonably high. It is of course explained by the 'plaza stop' legislation (2011) and the market growth. Given that online trading is in the 'Other' category, I do not agree with its decrease, as this form of trading is one of the fastest growing shopping channels.

The 'plazastop' legislation

The Hungarian Parliament voted into law the so-called 'Plazastop' legislation on the 28th of November 2011. Act CLXVI of 2011 on the modification of the established 2012 budget – modification of the Act LXXVIII of 1997 on the formation and protection of the built environment.

This legislation forbids the development of retail units bigger than 300 square metres between 1 January 2012 and the end of 2014. The law reasons that *'the submitted policy is important because in Hungary the trade concentration increased significantly in a short period of time. 69% of retail sales are dominated by the large and medium size enterprises, which represent only 1% of the total number of commercial enterprises. About 99% private, micro and small enterprises receive only 31% of the total market share. This trend would have been difficult to reverse, but could be mitigated by the proposed legislation'.* (*index.hu*, 2011)

In the domestic retail sector the two German „hard discounts", Lidl's and Aldi's expansion are the most striking change. Located closer to residential areas, typically selling less goods at a very low price – the hard discounts' expansion was significant. The two companies have equally gained market share not only from the domestic retail chains – CBA, Coop, Real –but also from the super- and hyper markets. The 'plazastop' law can put on a hold – for a while - the growth of Lidl and Aldi. The multinational retail chains are not opposed to the idea of the 'plazastop' law as the industry's crisis taxes have already stopped their development (*Trade Magazin*, 2011b).

Customer behaviour aspects for store choice

'Inthe domestic food retail situation it has not yet been clarified whether we belong to the Nordic or the Southern model. In the Nordic model the small stores role is only complementary, whereas in the Southern model it is significant. Based on the customer groups and purchase frequency (daily, weekly or monthly big) we belong to a different model. The current concentration of the Nordic model's significant level is not reached but we exceed the Southern model complementary level. The state of the art domestic services development is moving towards the Nordic model. It is also possible that the transition between the two models will be maintained for a longer period of time in Hungary '(*Földi*, 2008a 1-2 p.).

The frequency of shopping

Households usually perform two kinds of shopping. One is to replace the products they have run out of (daily shopping), or to perform 'big shopping' (to pile up their stocks for a longer period of time). Very often the shopping is done in different locations. Daily shopping is influenced by convenience (the distance of the shop) whereas weekly and monthly big shopping locations are chosen by the prices and variety of their goods. In case of larger shopping it is most likely that customers spend more time in the store, are willing to travel further. Additionally, the whole family is there and the spending budget is flexible (*Földi*, 2008b 2 p.).

Models of customer behaviours

The decision to purchase is a multi-stage process. Customers not only choose products but before that they also choose the store and this can influence their decision. Sudden impulse purchase can be influenced by many factors. The store choice can be appropriate for the customer, for the shopping or can be special. The choice of location may precede or follow the brand choice. There are two major trends in the choice of location. In the case of task-oriented buying, the cheapest source of supply is chosen; in that of the experiential purchase, prestige-consuming and high-quality product selling stores are on the list (*Törőcsik*, 1998).

Marketing science distinguishes several models of consumer behaviour regarding food shopping. The principal ones are (*Lehota*, 2001):

1. PILGRIM model: food acceptation is dependent on perception. Food perception is a function of three factors: physiological effects of the food, perception of sensory attributes, and influences from the environment.
2. STEPHERD food consumer and buying behavioural model is the further developed version of the PILGRIM model.
3. In GUNERT's food-oriented life-style model shopping motivations, consumption situations, and ways of purchases are displayed.

Commercial unit choice models

In the store selection and purchasing the following factors are relevant:

- The shop's image
- Retail ads
- Location of the store
- Size of the store
- The placement of products on the shelves
- Location of the goods in the shop
- The business atmosphere and interior design

Without being fully complete the three major models are (*Földi*, 2008a):

1. SCIPIONE presents in his model the elements related to store choice and refers to distance as a time factor, and also highlights customers' lack of time, need for convenience.
2. In the ASSAEL model the household, the customer characteristics (demographic characteristics, roles, lifestyle, personality, economic conditions)

leads to the shopping needs. These determine the importance of the store characteristics, such as the general price level, the depth of range, comfort, features of the sales staff as well as exterior and interior store design. The store image is at the meeting point of customer needs and trader strategies. The closer to the need the image is, the more favourable the consumers' attitude is to the shop, and the more likely they are to purchase there.

3. SHETH-MITTAL-NEWSMANN store choice model analyses the accessibility (nearest, no significant extra distance), prices (good prices, competitive prices, significant discount, better price) and special offer assessments as influencing factors.

Store choice theories, models

According to *Káposzta* (2007) the location selection is based on micro-, macro- and geography economics. He states that the theory of choice of location investigates the behaviour of market players and from their decisions we can generalize the spatiality of economic activities. According to *Káposzta* (2007) site development theories have five successive phases. The five phase development well depicts that there are a large number of numerical, measurable economic factors, which are the fundaments of complex, specific location deployment decisions. This means that during the rational decision making process 'the decision maker has a set of criteria, expectations with which compares all the possible decision options, considers consequences and chooses the optimal solution' (*Káposzta*, 2007 36 p.).

The development of various site theories were collected by *Karhusz* (2003) as shown in *Table 1*.

Table 1

Development of site theories

Time	Representers	Trend	Factors
First third of XIX. century	Thünen	Spatial distribution of agriculture	to minimize production and transportation costs
1900–1920	Weber, Predöhl, Palander	industrial location theories	to minimize production, major production costs
1930-1940	Lösch, Hotelling	monopolistic competition	consumption - maximize revenue
1950-1970	Isard, Greenhut, Smith	regional production functions	production, consumption, infrastructure - mathematical optimization models
1970-	Stöhr, Malecki, Scott	complex, interdependent deployment decisions	innovation, skilled labor, high-tech industries

Source: *Karhusz*, 2003 1 p.

Site selection is one of the most typical strategic corporate decisions, because the advantages or disadvantages can affect the company's financial results for a long time. Accordingly, the economic, technical and political merits of deployment decisions have increased in importance.

Porter (1996) has also surveyed site choices. According to his study, the long-term competitive advantage of companies that made the company's productivity depends on both the macro and the micro-environment influences.

According to *Karbusz* (2003) the choice of location is influenced by two factors:

1. Hard site selection factors: approached from the logic of economics, as they are easily quantifiable:
   - economic stability
   - economic policy and industrial policy efforts
   - volume of trade relations
   - regional trade agreements
   - market size
   - foreign exchange rates and production costs
   - tax rates
   - state aid and subsidies
   - geographical environment
   - development of an artificial environment (infrastructure)
   - acquisition and recording market relative to location
   - the quantity and quality of the workforce in the region
   - local taxes and subsidies
2. Soft installation factors: difficult to quantify them, but their importance is equal to the weight of hard factors:
   - - policy stability
   - - legal framework
   - - characteristics of corporate finance
   - - potential site's image
   - - established companies
   - - regional innovation milieu
   - - quality of life for employees

According to *Sikos* (2009) the US chain stores began to search site selection options in the early 1900s. Their studies mainly concentrated on the pedestrian traffic volume and composition. Around 1930 the food chain stores dealt with site selection in greater depth, in order to determine the commercial units' market area and market share. 'The third phase of site selection research was after World War II, when the big shopping centre constructions started.' *Sikos* (2009, 3 p.)

Based on *Hoover and Giarratani's* (1999) study the appropriate choice of location depends on the following four factors:

1. local supply
2. local demand
3. supply delivered
4. local demand beyond the regional demand.

There are two different tactics to select from when choosing the site location. One of them builds on the fulfilment of unmet needs and is confident that the market rewards the satisfaction of needs. While the other tactic builds on the competition and expects to be proven stronger. This option benefits shops which have a good customer base, but are not considered capable enough to take advantage of opportunities. Often we find that after a short period of time the more aggressive party remains in the competition (*Radnóti*, 1993).

'The site selection of a retail chain unit is an important strategic decision as the location can be advantageous for the commercial unit, the convenient site accessibility is an important factor for the customers. The site can determine and influence the catchment area and the number of consumers. The location in terms of the enterprise is a micro-economic concept, which is important to be emphasised because after the political system collapse in Hungary a great number of retail units closed down due to their wrong chose of location' (*Mészáros*, 2007 42 p.).

Sikos and Hoffmann (2004) states that in general most retail companies operating in Hungary have developed their units well, but almost every chain probably has a randomly chosen location. The explanation to this is that the income-producing ability of each chain unit varies. While the companies do not expect scientific accuracy, they expect to avoid the largest errors if they use their research own results in their site selection. However, even this is no guarantee of success because it is necessary to use the proper site-choice models. The unpredictable behaviour of competitors is also non-negligible, so ultimately it is still likely to affect the evaluation of results.

Sikos (2009) states that the retail companies have identified two major requirements when choosing a location:

1. the sales potential of a particular location, prediction regarding the long-term success of the store
2. long term strategic plans, which identify the locations on a given geographic area, which provide optimum share from the market potential, minimize the risk of decreased sales and guarantee a maximum revenue in a certain period of time.

Distinction should be made in the strategy if:

- the company wants to increase its market share in an area where already present,
- open up new areas to do business
- thinking about buying another company

The site-selection strategy should be developed before starting the individual site analysis.

Sikos and Hoffmann (2004, 145 p.) claims that companies already present in a certain area should study and analyse the followings before further openings:

- 'determination of the target (future store type, size, product variety, design, services)
- analysis of economic conditions (employment characteristics, expected developmental processes)
- population, demographic analysis
- examination of environmental conditions (all the factors that can affect the business)
- competition assessment
- evaluation of competitors
- consumer habits

- the company's own market participation
- evaluate the performance of self business
- evaluation of self owned retail facilities and locations (1-9. points)
- determine non-covered areas
- monitoring of the competitors' site selection
- strategic business plan definition of site selection
- future assessment of the business state within the given area
- the project investment needs, earnings, return on investment
- written report on the basic data and the conclusions'

Those companies who plan to enter into a new market area should consider analysing points 1-7., 12 and 15. In case the of property acquisition, it is suggested to consider all 16 points, with major emphasis on the equipment of facilities as well as financial and management agreements.

It is important to clarify that the site selection and evaluation of research on store performance are two separate areas. In the first scenario, the task is to define the ideal location of the store, whereas in the second one the job is to evaluate the already operating stores performance, which is basically the extension of the site selection research.

Saturation of the trade market

Market saturation is an ideal and, thus, undesirable situation, which almost never exists and means different things for the various traders. This would be a condition in which (on a given area) just as many facilities operate in relation to how many consumers there are who can be properly served and the return is adequate for the investors or traders as well. However, in a certain area often too much or too little commercial units operate.

When there are not many stores in a given area, it means that the nearby commercial units are overcrowded and therefore the service level is inadequate, but on the other hand the investments pay back quickly. Investors and traders see good prospects and, of course, are looking for new opportunities to establish businesses. In a short time there will be too many commercial units, only this time consumers can effortlessly choose from the easy to access stores. In densely populated areas customers have the option to visit more units of a multi-store chain. These shops are spacious, comfortable to shop in, but traders and investors are likely dissatisfied with the return on investments. Every trader knows that when a commercial facility's capacity is in excess of the area, the performance starts to decrease. This is manifested in the decrease of sales per shop floor space and in increased costs. Due to the increase in operating costs the prices are increased (if this is possible because of the competition), otherwise the profit will be reduced.

As much as we try to be careful when selecting new sites, the market assessment is always affected by uncertainties, which most of the time are:

1. population change
2. changes in purchasing power
3. consumer expectations of service changes
4. changes in range

5. shopping behaviour change
6. climate change of the facilities
7. changes in investment opportunities.

These confounding factors may affect the business in the long-or short-term. The short-term problems are easier to handle with the closure of unprofitable stores, or as the population increases. The long term oversupply can only be handled by innovation. This may include, for example, the reduction of operating costs or more complex fulfilment of customer requirements. The reason during the 1930s crisis was the quantity of stores, excess of supply goods and long-term demand imbalance.

The long-term imbalance is not only a result of a major crisis, it may be caused by the prosperity, the economic recovery. In such cases, the solution can be the diversification of stores if they start to sell a wider range of goods. Such initiatives can always challenge the status quo and result in a new trade hierarchy. The unbalanced conditions usually last for a long time, although saturation, the perfect balance, only lasts for a moment. The constant aim of retail units' site selection is to maintain this perfect balance.

Case study

The research database is aggregated from Tesco's own records. It is a partial database, which contains 71 stores, small (app. 300 m^2 sales area) and large (app. 3 000 m^2 sales area) formats as well.

The stores in the database are aged from 1-7 years, including both profit and loss making units. The database contains information regarding both formats (size) with respect to the number of customers and sales information for a full year of operation. The year under review is a complete year of operation, which made it possible to except data representing the current situation.

Primary data:

x1 = net sales area (m^2)
x2 = store age (years)
x3 = number of customers (number of transactions) (per capita/year)
x4 = sales (net sales) (HUF/year)
x5 = competitive agglomeration (m^2)
x6 = number of people in the surrounding area (per capita)

The multiple linear regression models

The parameters of the multiple linear regression models were determined by using SPSS 19.00 software.

The models were run in both methods, in value and percentage of the dependent and independent variables:

1. ENTER: All independent variables are simultaneously included in the model, and their combined impact is analysed.
2. FORWARD: Begins by including the variable most highly correlated to the dependent variable in the model. Then including the next most correlated variable with F-test, allowing for the first explanatory variable in the model, and keep adding explanatory variables until no further variables are significant.

RESULT AND DISCUSSION

Customer number evolution coherence and difference by store size

Customer number evolution is a key factor in the store revenue and profitability. It was assumed that there are several factors involved and therefore I have analysed them. In the study I have separated the small and large formats.

Dependent variable: Customer Number (per capita/year) (x3) (*Table 2*).

Independent variables:

- Net sales area (m^2) (x1)
- Store Age (years) (x2)
- Competitive agglomeration (m^2) (x5)
- Catchment area population (per capita) (x6)

The empirical significance level of the ANOVA test shows that the prescribed linear regression relationship can be considered reliable. The model itself has sufficient explanatory power ($p<0.05$). The above written four independent variables explain the customer number evolution. In case of the small format the explanatory power is 41.8% and in case of the large format the explanatory power is 71.7%.

After running the SPSS program ENTER version with regards to the small format only the competitive agglomeration (x5) had remained significant, while in case of the large stores the store age (x2) and net sales area (x1).

Small format:

$$y = 132\,701 + 31 * x5 \quad (1)$$

Large format:

$$y = 3\,207 * x1 + 67\,054 * x2 - 9\,043\,051 \quad (2)$$

If the commercial units' net sales area in the catchment area would increase with 1 m^2. In case of the small formats this would indicate potentially 31 extra customers per year annualized on the store own customer number (all issued receipts). In relation to the large format stores it is important to highlight that the net sales area has a greater impact on the customer number than the age of the store. However, the importance of both independent variables remained significant. If the net sales area were increased with 1 m^2 in the large format stores, that would raise the number of customers presumably with 3 207 (number of transactions, number of issued receipts). Each additional year of operation is expected to increase the annual number of customers (number of transactions) with 67 054 in the case of hypermarkets.

The FORWARD version of the model indicated the following results (*Table 3*). Dependent variable same as previous version: Number of customers (per capita/year) (x3)

The combined explanatory power of the model is 40.4% in case of the small stores, whereas 71.2% for the large stores. In both formats two indicators were added to the calculation. Primarily, the competitive agglomeration (x5) was added into the model of the small format and, as a second step, the age of the store (x2). It should be noted that the database contained small format stores operating only a few years since their development had just started.

Table 2

Customer number evolution – ENTER version

Format and Model			Sum of Squares	df	Mean Square	F	Sig.
Small format	1	Regression	200972708977.597	4	50243177244.399	3.769	.018[a]
		Error	279912870056.288	21	13329184288.395		
		SUM	480885579033.885	25			
Large format	1	Regression	2957742492550.930	4	739435623137.733	25.325	.000[b]
		Error	1167903438696.310	40	29197585967.408		
		SUM	4125645931247.240	44			

Model Summary

Format and Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
Small format	1	.646[a]	.418	.307	115452.08655
Large format	1	.847[b]	.717	.689	170873.01123

Coefficients[a]

Format and Model			Unstandardized Coefficients		Std. Coeff.	t	Sig.	Collinearity Statistics	
			B	Beta	Beta			Tol.	VIF
Small format	1	(Constant)	132700.827	162474.890		.817	.423		
		x1 - Net sales area (m^2)	204.167	635.933	.059	.321	.751	.828	1.208
		x2 - Store Age (year)	44825.146	25014.046	.343	1.792	.088	.757	1.321
		x5 - Competitive agglomeration (m^2)	30.810	11.872	.776	2.595	.017	.310	3.223
		x6 - Catchment area population (per capita)	-1.226	2.094	-.174	-.585	.565	.314	3.180
Large format	1	(Constant)	-9043051.170	1477516.063		-6.120	.000		
		x1 - Net sales area (m^2)	3206.811	503.637	.599	6.367	.000	.800	1.250
		x2 - Store Age (year)	67054.148	14160.673	.430	4.735	.000	.858	1.166
		x5 - Competitive agglomeration (m^2)	-.324	2.500	-.102	-.130	.898	.011	87.967
		x6 - Catchment area population (per capita)	.167	.768	.170	.217	.829	.011	86.963

a: Predictors SF/LF: (Constant), Predicted Value for X; ((Net sales area (m2) (x1), Store Age (years) (x2), Competitive agglomeration (m2) (x5), Catchment area population (per capita) (x6); b: Dependent Variable X; Customer Number (per capita/year) (x3).

The beta values of the model indicated that the competitive agglomeration (x5) weighs approximately twice as much as the age of the store (x2). The above suggests that in the case of the small format stores competition has a very important role. In the large format stores the independent variables did not have significant importance in the evolution of customer numbers.

Table 3

Customer number – FORWARD version

Format and Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
Small format	1	.523[a]	.274	.244	120619.94125
	2	.635[b]	.404	.352	111663.50028
Large format	1	.735[c]	.541	.530	209879.92135
	2	.844[d]	.712	.699	168053.47515

Coefficients[a]

Format and Model			Unstandardized Coefficients		Std. Coeff.	t	Sig.	Collinearity Statistics	
			B	Std. Error	Beta			Tol.	VIF
Small format	1	(Constant)	297464.542	39973.777		7.441	.000		
		x5 – Competitive agglomeration (m^2)	20.786	6.909	.523	3.009	.006	1.000	1.000
	2	(Constant)	163235.284	70496.175		2.316	.030		
		x5 - Competitive agglomeration (m^2)	25.663	6.757	.646	3.798	.001	.896	1.116
		x2 – Store age (year)	49742.613	22235.688	.381	2.237	.035	.896	1.116
Large format	1	(Constant)	-10946273.872	1641640.187		-6.668	.000		
		x1- Net sales area (m^2)	3938.886	553.407	.735	7.118	.000	1.000	1.000
	2	(Constant)	-9367073.170	1351793.951		-6.929	.000		
		x2 – Store age (year)	67037.680	13389.343	.430	5.007	.000	.928	1.078
		x1- Net sales area (m^2)	3320.206	460.026	.620	7.217	.000	.928	1.078

a: Predictors SF: (Constant), Predicted Value for X; Competitive agglomeration (m^2) (x5); b: Predictors SF: (Constant), Predicted Value for X; Competitive agglomeration (m^2) (x5), Store Age (years) (x2); c: Predictors LF: (Constant), Predicted Value for X; ((Net sales area (m^2) (x1); d: Predictors LF: (Constant), Predicted Value for X; ((Net sales area (m^2) (x1), Store Age (years) (x2).

Presumably the reason is because with the hypermarkets market – especially in the countryside – there is less competition (fewer hypermarkets are present) than in case of the small formats. Next to the net sales area (x1) the age of the store (x2) was added to the model in case of the large stores. It had less effect on the dependent variable than the net sales area. This suggests that the targeted customers are purposely going to the shops with large floor space, while when choosing between small stores the store size is irrelevant.

Small format:

$$y = 163.235 + 26 * x5 + 49.743 * x2 \quad (3)$$

Large format:

$$y = 3.320 * x1 + 67.038 * x2 – 9.367.073 \quad (4)$$

Table 4 compares the results of the above models.

Table 4

Small and large store comparison – Number of customers (transaction/year)

Dependent variable (x3) - Number of customers (transaction/year)		
Independent variables: x1, x2, x5, x6		
SPSS - ENTER (variables at the same time)		
Small Format - significant		**Large format - significant**
x5 Competitive agglomeration		x1 Net sales are
		x2 Store age
CHANGE effect		
plus 1 m² commercial area in the catchment area = + 31 person (receipt)	x5 competitive agglomeration	
	x1 Net sales area	plus 1 m² sales are = + 3.207 transaction (receipt)
	x2 Store age	plus 1 year operation = + 67.054 customers (transaction/basket)
SPSS - FORWARD (variables step-by-step)		
Small Format		**Large Format**
1. x5 competitive agglomeration		1. x2 Store age
2. x2 Store age		2. x1 Net sales area

Coherence and difference of net sales by format size

With respect to store revenue and profitability, not only is the customer number decisive, but also the net sales development. It was assumed that several factors are involved and so I analysed it - keeping the different formats separate.

Dependent variable: Net revenue (net sales revenue) (HUF/year) (x4) (*Table 5*)

Independent variables:

- Store age (year) (x2)
- Customer number (per capita/year) (x3)
- Competitive agglomeration (m²) (x5)
- Catchment area population (per capita) (x6)

From the significance level it is presumed that the prescribed linear regression relationship can be considered reliable. The above written four independent variables explain the sales evolution. In case of the small format the explanatory power is 76.2% and in case of the large format the explanatory power is 77.1%.

The SPSS program ENTER version resulted that all four independent variables remained significant for small formats, and for large format only the customer number (x3).

Small format:

$$y = 70\ 349\ 274 + 719 * x3 + 2\ 473 * x6 - 16\ 719 * x5 + 38\ 665\ 441 * x2 \quad (5)$$

Large format:

$$y = 970\ 629\ 578 + 1\ 525 * x3 \quad (6)$$

Table 5

Net sales evolution – ENTER version

Format	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Small format	1	.873[a]	.762	.717	65577590.10259
Large format	1	.878[b]	.771	.748	305765450.28214

ANOVA[c]

Format and Model			Sum of Squares	df	Mean Square	F	Sig.
Small format	1	Regression	2,89740 * 10[17]	4	7.24349 * 1016	16.844	.000[a]
		Residual	9.03088 * 10[16]	21	4.30042 * 1015		
		Total	3.80048 * 10[17]	25			
Large format	1	Regression	1.25634 * 10[19]	4	3.14086 * 1018	33.595	.000[b]
		Residual	3.73970 * 10[18]	40	9.34925 * 1016		
		Total	1.63031 * 10[19]	44			

Coefficients[a]

Format and Model			Unstandardized Coefficients		Std. Coeff.	t	Sig.	Collinearity Statistics	
			B	Beta	Beta			Tol.	VIF
Small format	1	(Constant)	70349273.688	48874693.601		1.439	.165		
		x3 – Number of customers (per capita/year)	718.934	123.646	.809	5.814	.000	.585	1.710
		x6 - Number of people in the surrounding area (per capita)	2472.718	1187.024	.394	2.083	.050	.316	3.166
		x5 – Competitive agglomeration (m²)	-16718.792	7663.679	-.473	-2.182	.041	.240	4.163
		x2 – Store age (year)	38665440.540	14434095.292	.333	2.679	.014	.733	1.364
Large format	1	(Constant)	970629578.314	124948835.290		7.768	.000		
		x3 - Number of customers (per capita/year)	1525.431	199.390	.767	7.651	.000	.570	1.754
		x6 - Number of people in the surrounding area (per capita)	110.583	1364.279	.057	.081	.936	.012	85.592
		x5 - Competitive agglomeration (m²)	-356.120	4426.479	-.057	-.080	.936	.012	86.109
		x2 - Store age (year)	51686140.878	30626407.511	.167	1.688	.099	.587	1.703

a: Predictors: (Constant), Predicted Value for X; Store age (year) (x2), Customer number (per capita/year) (x3), Competitive agglomeration (m2) (x5), Catchment area population (per capita) (x6); b: Dependent Variable X; Net revenue (net sales revenue) (HUF/year) (x4)

According to the Beta values the net sales revenue is impacted the most by the customer number (x3) in both formats. The small format stores net sales revenue is affected half as much by the number of people living in the catchment area (x6), the age of the store (x2), the competitive agglomeration (the later had a negative impact

on the dependent variable) than the number of customers (issued transaction receipts). One more customer (one more basket) per year would additionally increase the net sales revenue of the small stores by HUF 719. In the case of the large stores the net sales revenue would increase with HUF 1 525. In the case of small format stores an extra operating year could generate HUF 38.665.441 net sales revenue per year. With respect to the small stores, if the number of residents would increase by 1 in the catchment area, that would result in an additional HUF 2 473 net sales revenue. However, if the commercial catchment area increased by 1 m^2, that would result in HUF 16.719 annualized net sales revenue loss.

The followings were identified in the FORWARD version of the model (*Table 6*).

Small format:

$$y = 170.968.344 + 612 * x3 + 45.528.690 * x2 \quad (7)$$

Large format:

$$y = 1.024.297.234 + 1.724 * x3 \quad (8)$$

Table 6

Net sales revenue – FORWARD version

Model Summary						
Format	**Model**	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	
Small format	1	.753[a]	.567	.549	82785668.23469	
	2	.839[b]	.703	.678	70008916.63757	
Large Format	1	.867[a]	.752	.746	306480347.24755	

Coefficients[c]									
Format and Model			**Unstandardized Coefficients**		**Std. Coeff.**	**t**	**Sig.**	**Collinearity Statistics**	
			B	**Beta**	**Beta**			**Tol.**	**VIF**
Small format	1	(Constant)	170968347.286	49806029.690		3.433	.002		
		x3 – Number of customers (per capita/year)	669.527	119.381	.753	5.608	.000	1.000	1.000
	2	(Constant)	96019355.154	48020838.160		2.000	.057		
		x3 – Number of customers (per capita/year)	612.208	102.485	.689	5.974	.000	.970	1.031
		x2 - Store age (year)	43528690.833	13395376.982	.375	3.250	.004	.970	1.031
Large format	1	(Constant)	1024297233.814	120087036.361		8.530	.000		
		x3 – Number of customers (per capita/year)	1724.141	150.889	.867	11.427	.000	1.000	1.000

a: Predictors SF: (Constant), Customer number (per capita/year) (x3); b: Predictors SF: (Constant), Customer number (per capita/year) (x3), Store age (year) (x2), a: Predictors LF: (Constant), Customer number (per capita/year) (x3).

The model combined explanatory power is 70.3% of the small format, compared to 75.2% for large format.

In the case of the small format, the number of customers (x3) was put first into the model and then, second, the age of the store (x2). The number of customer variables is more articulate than the age of the store. Only the customer number (x3) had significant importance in the evolution of net sales in case of the large format.

The summary of results can be reviewed in *Table 7*.

Table 7

Small and large format comparison – Net sales revenue (HUF/year)

Dependent variable (x4) – Net sales (HUF/year)		
Independent variables: x2, x3, x5, x6		
SPSS - ENTER (variables at the same time)		
SMALL FORMAT – significant		**Large format - significant**
x3 Customer number (per capita/year)		x3 Customer number (per capita/year)
x6 Catchment area population (per capita)		
x5 Competitive agglomeration		
x2 Store age		
CHANGE effect		
Plus 1 customer (transaction) = + 719 HUF/year	x3 Customer number (per capita/year)	plus 1 customer (transaction) = + 1 525 HUF/year
Plus 1 customer = + 2.473 HUF/year	x6 Catchment area population (per capita)	
Plus 1 m^2 commercial area in the catchment area = - 16.719 HUF	x5 Competitive agglomeration	
Plus 1 year operation = + 38 665 441 HUF	x2 Store age	
SPSS - FORWARD (variables step-by-step)		
SMALL FORMAT		**LARGE FORMAT**
x3 Customer number (per capita/year)		x3 Customer number (per capita/year)
x2 Store age		

CONCLUSIONS

I have analysed the various factors having impact on the number of customers and net sales revenue with regards to the retail units of Tesco. Database figures were collected from the company's own management information system. I have proven – considering the impact of the same independent variables on the dependent variables – that there are differences between the two store formats, and that the

weight ratio of the independent variables' impact on the dependent variable is different (based on the regression parameters).

Whereas the customer number is significantly affected only by the store's catchment competition in the small formats, the large format stores are impacted by the size of the net sales area and the age of the store.

Review of net sales figures – when the independent variables are added step-by-step into the model – indicated that the four independent variables explain in 77,1% the coming changes in the net sales in case of the small format and in 76,2% in the case of the large format. In both cases the most significant independent variable is the customer number. The small format stores' performance is also impacted by the age of the store, whereas the large format is only affected by the number of customers.

The presented results of the introduced modelling show that it is worthwhile and important to weight the different variables distinctively when choosing the adequate size and location of the future commercial unit.

REFERENCES

Földi K. (2008a): Different store selection in daily and weekly/monthly shopping in food retailing. (In Hung.) XII. Magyar és Világ tudomány napja Konferencia Budapest. 16. p. [Online] <URL: http://elib.kkf.hu/okt_publ/szf_26_08.pdf> [08.09.2010]

Földi K. (2008b): Relevance of factors affecting store selection on horizontal competition among food retailers. (In Hung.) Szolnoki Tudományos Közlemények 13. Szolnok. 13 p. [Online] <URL: http://www.szolnok.mtesz.hu/ sztk/ kulonszamok/2008/cikkek/foldi-katalin.pdf >[08.09.2010]

G. Tóth I. (2011): Store chains' competition awaiting for Customer. (In Hung.) In.: HVG 33. 35. 57-58. p.

GfK – Világgazdaság Online (2010): Discounters outperform the hypermarkets. (In Hung.) [Online] <URL: http://www.vg.hu/vallalatok/kereskedelem/a-diszkontok-lekorozik-a-hipermarketeket-326922> [08.09. 2010]

Gray G. (2011): "The VAT-increase is a slap on the customers' face" – interview with the leader of the Hungarian Tesco. (In Hung.) [Online] <URL: http://vallalkozoi.negyed.hu/vnegyed/20111223-gerry-gray-a-magyarorszagi-tesco-vezerigazgatoja-interju.html> [28.11.2011]

Hoover E.M., Giarratani F. (1999): Individual Location Decisions. In: An Introduction to Regional Economics. West Virginia University. Regional Research Institute. [Online] <URL: http://www.rri.wvu.edu/WebBook/ Giarratani/chaptertwo.htm> [28.11.2011]

index.hu (2011): Plaza stop is coming next year. [Online] <URL: http://index.hu/gazdasag/2011/ingatlan/plazastop_jon_jovore/> [10.11.2011]

Káposzta J. (Ed.) (2007): Regional Economics. (In Hung.) Debrecen. Debreceni Egyetem Agrár- és Műszaki Tudományok Centruma Agrárgazdasági és Vidékfejlesztési Kar. 268 p.

Karhusz P. (2003): The theoretical framework of site selecion. (In Hung.) 12 p. [Online] <URL: http://www.bgf.hu/pszk/szervezetiegysegeink/oktatasiszervezetiegysegek/kozgazdinttanszo/tantargyak/regionalisgazdasagtan> [08.09.2010]

Lehota J. (2001): Food marketing. (In Hung.) Budapest. Műszaki Könyvkiadó. 327 p.

Porter M.E. (1996): Competitive Advantage, Agglomeration Economies, and Regional Policy. In: International Regional Science Review. 19. 1-2. 85-94 p.

Radnóti É. (1993): Commercial competition and the optimal choice of business premises. (In Hung.) In: Kereskedelmi Szemle. 34. 6. 15-18 p.

Sikos T. (2009): GIS – Site selection. (In Hung.) lecture notes 26 p. [Online] <URL: http://www.mrtt.hu/konferenciak/terinformatika/sikos.pdf> [10.12.2011]

Sikos T., Hoffmann I. (2004): The new cathedrals of consumption. (In Hung.) Budapest. MTA Társadalomkutató Központ. 380 p.

Törőcsik M. (1998): Trade Marketing. (In Hung.) Budapest. KJK-KERSZÖV Jogi és Üzleti Kiadó. 262 p.

Trade Magazin (2011b): Plaza stop: the construction permit can be in the pocket of the store chains. (In Hung.) [Online] <URL: http://www.trademagazin.hu/piaci-hirek/plazastop-az-aruhazlancok-zsebeben-mar-ott-lehet-az-epitesi-engedely.html> [22.11.2011]

Corresponding author:

Adrienn KURUCZ
H-1135 Budapest, Szent László utca 28-30. D ép. III. 26.,
Tel: + 36 30 235 20 61
e-mail: adriennkurucz@hotmail.com